it all success. We consider that the example set by Sir W. J. Hooker is highly deserving of imitation, as, although none can more admire splendid botanical plates, still we feel that cheap but correct working drawings, such as are supplied by this work and the 'Icones Plantarum,' are of far greater real use to botanists, many of whom are precluded by their price from becoming possessors of more beautiful but not more accurate works.

PROCEEDINGS OF LEARNED SOCIETIES.

ROYAL SOCIETY OF EDINBURGH.

Dec. 18, 1843.—Dr. Abercrombie in the Chair.

The only communication of the evening bearing on natural history was a paper by Professor Traill "On the Luminousness of the Sea, and on some of the Animals which appear to produce it."

The author stated that this phænomenon seems scarcely to be noticed in the writings of Aristotle or of Pliny which have reached us, though Pliny was familiar with the light emitted by certain shell-fish, and by the *Sea Lung* or Medusa.

Mr. Boyle gives an account, from the journal of a ship-master, of the luminousness of the sea; and it is particularly detailed, from personal observation, in the Indian Voyage of Father Bourzes in 1704.

The first philosophers who ascribed it to light emitted by living animals would seem to be the Abbé Nollet, Professor Vianelli, and Dr. Gressellini of Venice, about the middle of the last century. In Cook's first voyage, the luminous properties of several marine animals are well described by Banks and Solander; and in his second voyage by Forster. Spallanzani made some good experiments on the phosphorescence of a Medusa in the Straits of Messina.

Since that period the catalogue of Noctilucous animals has been greatly enlarged, especially by Perou and LeSueur, the naturalists to the French 'Voyages des Découvertes aux Terres Australes.' A good paper on the Luminousness of the Sea, by Mr. Macartney, appeared in the 'London Phil. Trans.' for 1810, in which the phænomenon is ascribed entirely to living animals; an opinion now generally embraced by naturalists.

The author then detailed his own experiments and observations, made from early life, in different parts of the European Atlantic from lat. 62° to 36° N., chiefly around the shores of Britain, all which confirmed this opinion.

He detected in 1814 several of the same noctilucous animals in the waters of the Bay of Biscay as in our own seas, especially the *Noctiluca miliaris*, *Orithya minima*, and a very minute Crustacean, seemingly a *Zoë*.

Besides these, the *Beroë fulgens* of Macartney, and several other Medusaria, he found two very remarkable animals in the luminous waters of the seas around the Western Isles of Scotland; one an *Æquorea*, most splendidly phosphorescent, which seems to be *Æquo-*

rea Mesonema of Eschscholtz; and the other a most elegant *Cydippe*, probably the *Cydippe pomiformis* of Patterson. Both were carefully figured from life by the author, and magnified drawings of them were exhibited to the Society.

The paper was concluded by some strictures on the hypothesis of Lamarck respecting the absence of muscular power and of voluntary movements in the order of *Radiaires Mollasses*. He gave the results of many experiments which he had made on the movements of the *Medusæ*, and which convinced him that they possessed considerable muscular power obedient to volition; and he ascribed the erroneous views of Lamarck on this subject to his little familiarity with those animals in their natural haunts; for a Medusa swimming in the sea, and cast on the beach, has very different capabilities of locomotion.

BOTANICAL SOCIETY OF EDINBURGH.

This Society held its second meeting for the season on Thursday January the 14th, W. C. Trevelyan, Esq., in the Chair.

Professor Graham read the continuation of his botanical tour to the South of England and Jersey; in the course of which he mentioned the various plants observed so far as peculiar to those districts, or only of rare occurrence in Scotland. He was rather surprised to notice species growing in considerable quantity that have, for the most part, been very sparingly supplied to the Society; a circumstance which shows the desirableness of English botanists keeping in view, when making their annual collections, that such species, though not uncommon to them, must be always in demand among their Scotch brethren. The Professor also made some observations on the climate and general aspect of the island of Jersey, in reference to its height above the level of the sea, the nature of its soil, &c., as bearing on the vegetation. At the close of public business the meeting proceeded to the election of office-bearers for next year, when the following gentlemen were appointed, viz. President, Professor Graham; Vice-Presidents, Dr. Neill, David Steuart, Esq., W. C. Trevelyan, Esq., and W. H. Lowe, Esq., M.D.

Jan. 11, 1844.—Professor Graham, President, in the Chair.

1. Read "A short Notice of some recent Improvements on Ward's Plant-cases," by their inventor. The principal improvement consists in dividing the case into several compartments with different soils in each; so that plants which naturally grow in moist situations may thrive under the same roof with others usually found in drier localities.

2. "A Catalogue of the *Musci* and *Hepaticæ* of Teesdale," by Mr. Richard Spruce of the Collegiate School, York. This highly interesting paper, in which six species new to the British flora are described, was illustrated by a series of beautiful specimens, for which the thanks of the Society were specially voted to Mr. Spruce.

3. "Notes on a new *Œnanthe*," by the Rev. W. H. Coleman. Drawings of the fruit and leaves were exhibited to the meeting to

show the difference between it and *Œ. Phellandrium*, to which it is nearly allied. As this and the preceding paper will appear at length in the 'Annals and Magazine of Natural History,' it is unnecessary here to give an abstract of them.

4. Mr. James M'Nab read the first part of a journal kept by him while on a tour through the United States and the Canadas, during which his attention was chiefly directed to the botany and horticulture of these countries.

Mr. Trevelyan laid before the meeting cones of *Pinus sylvestris*, exhibiting on the one side the character of *P. sylvestris*, and on the other that of *P. Mughus*. He stated that the cones were taken from a tree near Taunton in May 1843, differing in no other respect from the ordinary state of *P. sylvestris*, and the phænomenon now presented by them appears to substantiate the views of those botanists who believe the two species to be identical.

ZOOLOGICAL SOCIETY.

March 14, 1843.—William Yarrell, Esq., Vice-President, in the Chair.

A paper by Mr. G. B. Sowerby was read, containing the following descriptions of new species of Shells belonging to the genus *Cyclostoma*. The species described are chiefly from the collection of H. Cuming, Esq.

Cyclostoma suturale. *Cycl. testâ orbiculato-depressâ, tenui; epidermide olivaceâ indutâ; anfractibus* 3–4 *rotundatis, transversim tenuissimè striatis; aperturâ circulari, supernè emarginatione obsoletâ; peritremate tenui, margine acutiusculo; umbilico patulo; operculo concinnè spirali.*

Hab. in umbrosis Demeraræ.

A few specimens of this species were received many years ago by G. C. Bainbridge, Esq., of Liverpool.

Cyclostoma rugulosum. *Cycl. testâ orbiculato-subdepressâ, tenui, translucidâ; anfractibus* 4–5 *rotundatis, rugulosis; suturâ distinctâ; aperturâ rotundatâ, supernè acuminatiusculâ; peritremate tenui, margine acutiusculo; umbilico magno.*

Hab. in Jamaicâ.

Found among the shells in the collection of the late G. Humphrey.

Cyclostoma semistriatum. *Cycl. testâ orbiculato-subdepressâ, tenui, albidâ, fasciis pallidè fuscis interruptis; spirâ subprominulâ, apice obtusiusculo; anfractibus* 4–5 *rotundatis, supernè longitudinaliter striatis, infrà levibus; suturâ distinctâ; aperturâ circulari, supernè subacuminatâ; peritremate obsoletissimè subreflexo, tenui, margine acutiusculo; umbilico magno; operculo sulco externo spirali, anfractibus* 4–5.

Hab. in Indiâ Orientali, in regione Poonah dictâ.

Cyclostoma translucidum. *Cycl. testâ subglobosâ, subpellucidâ, albâ; epidermide corneo-indutâ; spirâ breviusculâ, obtusâ; anfractibus quatuor rotundatis, propè suturam elevatiusculis, striatis, supernè rugulosis; aperturâ subcirculari, supernè subacuminatâ;*

peritremate acuto; umbilico mediocri; operculo testaceo, tenuiusculo, anfractibus septem, striatis.

Cyclostoma Brasiliense. *Cycl. testâ orbiculato-subdepressâ, tenui, albâ, opacâ; anfractibus* 4–5 *rotundatis, transversìm striatis; suturâ profundiusculâ; aperturâ circulari; peritremate tenui, acuto; umbilico magno; operculo testaceo, duplicato, extùs tenuissimè spirali.*

Hab. in umbrosis propè Rio Janeiro, Brasiliæ.

Cyclostoma giganteum. *Cycl. testâ orbiculato-subdepressâ, crassiusculâ, albicante; epidermide corneâ, fulvâ, indutâ, apice rufescente; anfractibus* 5–6 *rotundatis, transversìm striatis, striis supernè validioribus; suturâ distinctâ; striâ longitudinaliter impressâ propè suturam; aperturâ subeffusâ, supernè angulatâ et in canalem inconspicuam subdecurrente; peritremate subincrassato; umbilico magno; operculo lineâ elevatâ spirali, interstitiis obliquè striatis.*

Hab. in sylvis propè Panamam.

Cyclostoma corrugatum. *Cycl. testâ orbiculato-subdepressâ, crassiusculâ, albidâ, apice rufescente; epidermide tenui, fuscâ, indutâ; spirâ subprominulâ, acuminatiusculâ; anfractibus quinque rotundatis, transversìm striatis et corrugatis; suturâ distinctâ; aperturâ circulari, subeffusâ, supernè angulatâ et in canalem inconspicuam desinente; peritremate tenuiusculo, margine acutiusculo, latere umbilicali incrassato; umbilico magno, margine crenulato, intùs transversìm striato; operculo testaceo, extùs laminâ elevatâ, convolutâ, intùs corneo, polito.*

Hab. Jamaica.

Cyclostoma clathratulum. *Cycl. testâ subglobosâ, crassiusculâ, obscurâ; spirâ subconoidali, apice obtusiusculo; anfractibus quatuor ad quinque rotundatis, supernè longitudinaliter tenuiter striatis, infrà lævibus; aperturâ subovali, supernè angulatâ; peritremate incrassato, suprà umbilicum mediocre paululùm extenso.*

Hab. apud Yemen, Arabiæ.

Cyclostoma tigrinum. *Cycl. testâ suborbiculari, conicâ, crassiusculâ, læviusculâ, pallescente, strigis irregularibus, transversis, saturatè brunneis pictâ; spirâ subacuminatâ, submammillari; anfractibus quinque, raptim crescentibus, rotundatis, plerumque carinis tribus vel quatuor subobsoletis; aperturâ magnâ, orbiculari, posticè subemarginatâ; peritremate reflexo, albo, incrassato, propè ultimum anfractum subinterrupto; labio columellari subextenso umbilicum mediocre partim tegente; suturâ distinctâ; operculo tenui, corneo, multispirali, anfractuum marginibus lamellosis.* Long. 1·0; lat. 1·25 poll.

Mr. Cuming has collected the following varieties, viz:—

Var. *a*. Shell with three rather indistinct spiral ridges; peritreme nearly white.

Var. *b*. Shell with three rather indistinct spiral ridges; peritreme dull brown. Found under decayed leaves in the island of Guimaras.

Var. *c*. Shell with a more elevated spire and with three prominent spiral ridges, together with some small interstitial ridges. Found under decayed leaves in the island of Masbate.

Var. *d*. Shell dark brown, with less conspicuous streaks; aperture orange-brown. Found under decayed leaves in the island of Leyte.

Var. *e*. Shell like var. *d*, but larger and paler. Found under decayed leaves at Catbalonga, in the isle of Samar.

Var. *f*. Shell prettily variegated with dark brown. Found on leaves of bushes in the island of Siquijod.

Var. *g*. Shell small and thicker, with rather elevated spire and prominent ridges. Found under decayed leaves at Baclayan.

Cyclostoma Pileus. *Cycl. testâ conicâ, tenui, albidâ, fusco pallidissimè nubeculatâ; spirâ subacuminatâ; anfractibus quinque, planulatis, anticè carinatis; aperturâ rotundato-subtrigonâ, extùs angulatâ; peritremate albo, reflexo, labiis posticè disjunctis; umbilico parvo.* Long. 0·7; lat. 0·6 poll.

Hab. infra foliis putridis apud Sinait, provinciæ Ilocos meridionali, insulæ Luçon. H. Cuming.

Var. *a*. Shell pale brown, mottled; peritreme white. Found at Sinait.

Var. *b*. Shell white. Found in the same situation and locality.

Var. *c*. Shell white, larger than var. *a* and *b*, with a sharper keel. Found on leaves of trees at St. Juan, in the province of Cagayan.

Cyclostoma linguiferum. *Cycl. testâ suborbiculari, subconicâ, crassâ, pallescente, maculis saturatè brunneis angulatìm variegatâ; spirâ subacuminatâ, submammillari; anfractibus quatuor, rotundatis, levibus, spiraliter obsoletè striatis; aperturâ magnâ, orbiculari; peritremate incrassato, subreflexo; labio internè linguam latam efformante; umbilicum partim tegente.* Long. 1·1; lat. 1·25 poll.

Hab. infra foliis putridis, in sylvis, apud Lobock, insulæ Bohol.

Var. *a*. Light brown, variously mottled with dark brown.

Var. *b*. Much paler in colour, and having the spiral striæ much more distinct.

Var. *c*. Yellowish brown, with an orange mouth.

Cyclostoma Listeri, Gray. *Cycl. testâ subglobosâ, crassiusculâ; spirâ conoideâ, subacuminatâ; anfractibus 4–5 rotundatis, lævibus, nonnunquam supernè longitudinaliter obsoletè striatis; suturâ distinctâ; aperturâ circulari; peritremate subincrassato, supernè angulato, latere umbilicali calloso, callo umbilico partim obtegente; umbilico parvo, spiraliter striato.*

Var. *a*. *Testâ omnino albicante.*

Var. *b*. *Testâ pallidè fulvâ, fasciâ inferiore fuscâ.*

Hab. in insulâ S^ti^ Mauritii.

Mr. Lovell Reeve's descriptions of various new Shells, about to be figured in the 'Conchologia Iconica,' were then read.

Pleurotoma Garnonsii. *Pleur. testâ elongato-turritâ, gracillimè fusiformi, albidâ, transversim multicarinatâ, carinis maculis parvis rubido-fuscis vividè pictis; anfractibus convexis, macularum gran-*

dium serie supernè ornatis; anfractu ultimo infrà fusco-fasciato; canali plus minusve elongato.

Pleurotoma Babylonia var., Kiener.

Long. $2\frac{1}{2}$; lat. $\frac{1}{2}$ poll.

Hab. Island of Zebu, Philippines.

We have much pleasure in dedicating this species to our excellent friend the Rev. W. L. T. Garnons, F.L.S. &c. The labour which this worthy gentleman has bestowed on the arrangement of the Woodwardian collection of shells at Cambridge bears ample testimony of his zeal for the science. Several specimens have lately made their appearance in London, but we are not aware from whence they have arrived. The above locality is obtained from a single specimen found by Mr. Cuming at that place, lying dead upon the shore at low water.

Pleurotoma spectabilis. *Pleur. testâ subelongato-turritâ, multicingulatâ; albâ, cingulis nigro-maculatis, maculis grandibus et parvis, numerosissimis, anfractibus convexis, suprà et infrà fusco-fasciatis; canali brevi, leviter flexuosâ.* Long. $2\frac{1}{2}$; lat. $\frac{5}{8}$ poll.

Hab. Island of Ticao, Philippines (on the reefs).

The spotting is of a more numerous and miscellaneous character in this species than in any of the genus, though it presents in certain respects a modification of that in the preceding species. The dusky band which girds the lower portion of the whorls in that species is exhibited both round the lower and upper portions in this, and the number of spots is apparently doubled in like manner; the canal is short, and presents a great peculiarity of character.

Pleurotoma exasperata. *Pleur. testâ turritâ, anfractibus in medio tuberculato-muricatis, tuberculis solidis acutis; albâ, anfractu ultimo zonâ fuscâ cingulato; canali brevissimo; columellâ albâ, supernè callosâ; aperturæ fauce albo.* Long. $\frac{7}{8}$; lat. $\frac{3}{8}$ poll.

Hab. ——?

This interesting little shell resembles the *Pleurotoma unizonalis* in being surrounded with a single clear dark band; but it differs, first, in being of a more turreted form; secondly, in having the whorls encircled with a sharp row of tubercles instead of longitudinal ribs; and thirdly, in the columella and interior being white, whereas in that species it is always brown.

Pleurotoma arcuata. *Pleur. testâ arcuato-fusiformi, tenui, inflatâ, subpellucidâ, anfractibus lineatis, in medio acutè carinatis, carinâ maculis fuscis regularibus ornatâ; labro externo rotundato ab anfractu ultimo sinu lato separato; canali gracili, arcuato, spiræ longitudinem æquante.* Long. $1\frac{5}{8}$; lat. $\frac{3}{8}$ poll.

Hab. Coast of Veragua, Central America.

A few specimens only of this inflated transparent-looking shell were collected at the above-mentioned place by R. Hinds, Esq., of Her Majesty's ship 'Sulphur,' a zealous and intelligent conchologist.

Pleurotoma picta (Beck, MSS.). *Pleur. testâ acutissimè turritâ, solidâ transversim carinatâ, albâ, carinis perspicuis, subdistanti-*

ous, maculis fuscis perparce pictis, carinâ superâ valdè maximâ, labro fissurâ parvâ, subcentrali; canali recto, spiræ longitudinem æquante. Long. 2; lat. $\frac{1}{2}$ poll.

Hab. Panama, St. Blas, Gulf of Nicoya, &c.

This shell is of a straight solid growth, and cannot well be confounded with any species hitherto described.

Pleurotoma papalis. *Pleur. testâ fusiformi, acutè turritâ, pallidè luteo-brunnescente, anfractibus supernè concavis, longitudinaliter leviter liratis, liris numerosis, anfractu ultimo pallidè albo-fasciato; canali brevi.* Long. $1\frac{7}{8}$; lat. $\frac{1}{2}$ poll.

Pleurotoma mitræformis var., Kiener.

Hab. ——?

After carefully examining one or two specimens of this shell, which Kiener describes as a variety of the *Pleurotoma mitræformis*, I am forced to the conclusion that it is specifically distinct.

Pleurotoma obesa. *Pleur. testâ obeso-fusiformi; spirâ turritâ, anfractibus luteolis, supernè albis, lineis fulvis, obliquis, longitudinaliter venosis; labro acuto, sinu subcentrali; canali mediocri, brevi subitò reflexo.* Long. $1\frac{3}{8}$; lat. $\frac{1}{2}$ poll.

Hab. ——?

The solid obesity of this shell has suggested the above title.

Pleurotoma virginea (Beck, MSS.). *Pleur. testâ fusiformi-turritâ, pallidè luteolâ; anfractibus in medio angulatis, tuberculis minutis albis seriatim cinctis; anfractu ultimo multiseriatim granuloso; canali mediocri, leviter recurvo.* Long. $1\frac{5}{8}$; lat. $\frac{1}{2}$ poll.

Hab. Mouth of the Gambia.

This shell, though comparatively common in our collections, does not appear to have been hitherto described.

Pleurotoma annulata. *Pleur. testâ solidâ, subulatâ, brunneâ; anfractibus leviter convexis, liris lævibus, pallidioribus, numerosis, annulatim cinctis; canali subelongato.* Long. $1\frac{7}{8}$; lat. $\frac{1}{2}$ poll.

This shell is not very much unlike the *Pleurotoma Deshayesii*; it may however be readily distinguished from that species by the number of well-marked ring-like ridges by which the entire surface is encircled.

Pleurotoma catena. *Pleur. testâ elongato-fusiformi, turritâ, acuminatâ, flavido-griseâ; anfractibus medio valdè convexis, quasi subitò tumidis, tuberculis eximiis, albis, obliquis, seriatim coronatis; labro tenui, sinu lato; canali elongato, recto.* Long. $2\frac{1}{4}$; lat. $\frac{1}{2}$ poll.

Hab. ——?

The leading feature of this new and very distinct shell is the bright perlaceous series of link-shaped tubercles which run round the periphery of the whorls.

Pectunculus giganteus. *Pect. testâ valdè convexâ (juniore depressâ), solidâ, giganteâ, longitudinaliter striatâ, striis contiguis, regularibus, et sulcatâ sulcis ferè obsoletis; albâ, infernè castaneo-tinctâ, supernè maculis rubido-fuscis numerosis, undatis, contin-*

gentibus, profusè et vividè pictâ; intùs albâ, marginibus (in adultâ) castaneo-nitidis, crenatis; epidermide crassâ, pilosâ. Alt. 4; long. $3\frac{3}{4}$; lat. 2.

Hab. Guaymas, Gulf of California.

This magnificent shell, which was brought from the above port by Mr. Babb, R.N., accords in some measure with Lamarck's description of his *Pectunculus undulatus*. The figure in Delessert's 'Recueil de Coquilles,' however, of that shell, fully exhibits its specific difference.

PECTUNCULUS RARIPICTUS. *Pect. testâ subobliquè cordatâ, radiatim costatâ, costis planis in medio sæpè sulcatis; costarum interstitiis profundis; albâ luteo-castaneâ, parcè variegatâ, intùs albâ, anticè purpureo-tinctâ.*

Hab. —— ?

The ribs in this shell are peculiarly firm and squarely grooved out, as it were, and they are often slightly rutted about half-way up the middle.

PECTUNCULUS AURIFLUUS. *Pect. testâ orbiculari-cordatâ, inæquilaterali, radiatim costatâ, costis obsoletè sulcatis; albâ, transversim auriflua, anticè maculis aureis nigerrimo-fuscis marginatis.*

Hab. —— ?

This new and beautiful shell may be easily recognised by its very bright orange painting.

PECTUNCULUS HOLOSERICUS. *Pect. testâ suborbiculari, lævi, albidâ, multiradiatâ, epidermide sericâ indutâ.*

Hab. —— ?

The peculiar, close, velvety epidermis of this shell is alone sufficient to distinguish it.

Mr. Fraser characterized two new species of Birds from Western Africa:—

MUSCIPETA SMITHII. *Musc. corpore pallidè rufo; caudâ, alisque nigrescentibus, cinereo-lavatis; capite, collo, rostro, pedibusque nigris.*

Long. tot. $7\frac{3}{4}$ unc.; *alæ*, 3 unc. 4 lin.; *rostri*, a rictu ad apicem, 10 lin.; *caudæ*, 3 unc. 10 lin.

Hab. Western Africa.

The dimension above given of the tail of this bird includes the two central feathers, which are about half an inch longer than either of the others; these latter, when spread out, form a segment of a circle, the outermost feathers being the shortest. The head and neck are glossy black, but in certain lights exhibit a slight bluish tint: the whole body and wing-coverts are of a rust-colour, for the most part pale, but assuming a decided and rich hue on the abdomen; the tail and feathers of flight in the wings are of a deep brownish gray, but inclining to black. The bill is stout.

TRERON CRASSIROSTRIS. *Trer. viridis; capite, collo pectoreque cinerascenti-viridibus; ventre citrino; alarum tectricibus regione carpali vinaceo-purpureis; remigibus fusco-nigrescentibus; caudâ*

nigrâ ad apicem latè cinereo-fasciatâ; rostro magno, pedibusque pallidis.

Long. tot. 12 unc.; *alæ*, 6¾; *caudæ*, 4¼; *rostri*, 11 lin.

Hab. ——?

This species is remarkable for its stout bill, which is of a very pale grayish colour, tinted with yellow on the upper surface at the base. The vinaceous patch at the angle of the wing is but of small extent; the primaries, secondaries, and some of the greater wing-coverts are narrowly margined externally with bright yellow, and the vent and some of the under tail-coverts, as well as the greater portion of the feathers covering the thighs, are of the same colour; the larger under tail-coverts are of a reddish brown colour, and the feet are yellow.

March 28.—William Yarrell, Esq., Vice-President, in the Chair.

The following descriptions of new Shells, from the collection of Captain Sir Edward Belcher, R.N., C.B., &c., by Richard Brinsley Hinds, Esq., Surgeon R.N., were read:—

The great accession of species to the genus *Pleurotoma*, as left by Lamarck, renders it necessary that our views respecting it should receive some modification. A very prominent circumstance is, that the frequent repetition of previously trivial characters has elevated them to a situation of importance, and they are thus liable to become the distinctive grounds of new and characteristic groups. I commenced my examination with the species collected in the Sulphur, being about 120 in number; and subsequently I have had the opportunity of extending my researches among the extensive collection assembled together by Mr. Lovell Reeve, from the cabinets of various conchologists, but particularly from that of Mr. Hugh Cuming, the whole amounting in all probability to more than three hundred species. It is not my intention to attempt anything like a monograph of the group, but as it was necessary to make an extensive revision of the subject, to place the species in my hands in their proper position, I trust I shall be doing a service by recording the views which became developed in the prosecution of the work. I shall, however, confine my remarks to those genera, the mention of which is necessary to the elucidation of my species.

PLEUROTOMA, Lamarck.

A beautiful genus, presenting the typical characters of the group in their intensity, and capable of being satisfactorily defined. It consists of shells which are elongated and fusiform, having the spire and canal most frequently nearly equal in length; the sinus a slit, usually anterior to the most prominent part of the whorl, with a sharp margin; aperture oval; canal straight, and almost constantly lengthened; outer lip thin, smooth within, usually crenulated on the margin, from the termination of the lesser keels; inner lip rarely produced; sculpture generally transverse. The species are rarely found beyond the tropics, and do not abound in individuals, being found few in number: they are nearly equally abundant in the Ame-

rican and Asiatic Seas, but are remarkably absent from the Pacific Ocean. They never occur on the shores, being always obtained from deep water, and usually on a muddy bottom; to this latter circumstance is probably attributable their singular absence from the Pacific, where coral prevails.

PLEUROTOMA NOBILIS. *Pleur. testâ fusiformi, solidâ, rugosâ; anfractibus supernè concavis, leviter striatis, propè mediam carinâ maximâ, infernè, præcipuè ultimo, carinis parvis alternantibus; suturâ simplici; labio externo subintegro, interno infernè paululùm producto; epidermide pallidè fuscâ indutâ.* Axis 44 lin.

Hab. San Blas, Mexico. From seven fathoms; mud.

This is a very considerably larger shell than *P. oxytropis*, but in the character of the sculpture they closely approach each other. It is chiefly distinguishable from it in the absence of any keel between the principal keel and the suture, and in some minor characters.

PLEUROTOMA GEMMATA. *Pleur. testâ fusiformi, elongatâ, gracillimâ, fuscâ; anfractibus numerosis, medio uniseriatim tuberculato-carinatis; tuberculis rectis, subquadratis, albidis; carinis duabus, parvis, suturam comitantibus, anfractu ultimo multicarinatis; sinu laterali ponè carinam; aperturâ ovali; canali elongatâ.* Axis 9 lin.

Hab. Gulf of Magdalena, California. Obtained from seven fathoms, among sandy mud.

PLEUROTOMA JUBATA. *Pleur. testâ fusiformi, acuminatâ, lævigatâ, fulvâ; anfractibus medio carinatis, supernè granulis uniseriatim cinctis, infernè carinâ parvâ unicâ, sed ultimo pluribus; suturâ carinatâ; canali brevisculo.* Axis 12 lin.

Hab. The China Sea and north coast of Sumatra: dredged from a muddy bottom in eighteen fathoms.

PLEUROTOMA STOLIDA. *Pleur. testâ fusiformi, lævigatâ, corneâ; anfractibus supernè planulatis, infernè costatis; costulis albidis, brevibus, obliquis, in anfractu ultimo evanidis; apice papillari; suturâ simplici; canali brevi; labio externo tenui.* Axis 14 lin.

Hab. Lagulhas Bank, Cape of Good Hope: dredged from a depth of forty-three fathoms.

PLEUROTOMA GRAVIS. *Pleur. testâ fusiformi, lævigatâ, corneâ; anfractibus propè suturam angulatis, uniseriatim tuberculis parvis albidis cinctis, supernè latè planulatis; anfractu ultimo coarctato; apice papillari; suturâ simplici, ferè occultâ, canali brevi; aperturâ fuscâ.* Axis 11 lin.

Hab. Lagulhas Bank, Cape of Good Hope; in company with the preceding.

PLEUROTOMA INERMIS. *Pleur. testâ ovatâ, acuminatâ, inermi; anfractibus subrotundatis, flammeis undosis fuscis longitudinaliter ornatis, transversim striatis; suturâ simplici; aperturâ ovali; canali brevi.* Axis 15 lin.

Hab. Bay of Magdalena, California. From seven fathoms; sandy mud.

Pleurotoma violacea. *Pleur. testâ elongatâ, acuminatâ, violaceâ; anfractibus decenis multicarinatis, longitudinaliter minutissimè et creberrimè striatis; carinis duabus eminentioribus; labro tenui, acuto, crenulato; sinu laterali inter carinas; aperturâ ovali; columellâ biplicatâ; canali brevi.* Axis 8 lin.

Hab. North coast of New Guinea and Straits of Macassar. From seven to twenty-two fathoms; sandy mud. Also collected by Mr. Cuming at the Philippines.

The folds on the columella, for which this species is remarkable, are not to be met with in all the specimens.

Pleurotoma radula. *Pleur. testâ pyramidali, acuminatâ, corneâ; anfractibus nonis, lineis decussatis, uniseriatim tuberculatis; tuberculis sublunatis; labro tenui, acuto; sinu laterali ponè seriem tuberculorum; suturâ lineâ elevatâ instructâ; aperturâ ovali; canali brevi.* Axis 7 lin.

Hab. Straits of Malacca. In seventeen fathoms; mud.

Clavatula, Lamarck.

The shells of this genus are subfusiform or clavate; the canal sometimes so short as to be almost wanting, at others somewhat produced and recurved; sinus superior to the most prominent part of the whorl, with a callous everted margin; inner lip often produced; suture frequently embellished; sculpture nearly always longitudinal; outer lip with a slight inferior sinus. This genus is rather less tropical in its geographical relations than *Pleurotoma*. In attempting to trace the *limits of variation*, it may be observed that the canal is liable to fluctuate in length, as may be seen in *C. duplicata*, Sow. (sp.); also in the length of the spire. Varieties in colour are not infrequent, and have been remarked in the above species, in *C. flavidula*, Lamarck (sp.), and in *C. crenularis*, Lamarck, each of which has light and dark varieties. Lastly, the series of tubercles which some display are usually connected by a keel, and the particular sculpture fluctuates between each, as occurs in a remarkable manner in *C. cincta*, Sow. (sp.)

Clavatula militaris. *Clav. testâ turritâ, elongatâ, acuminatâ, albidâ; anfractibus supernè concavis et angulatis, plicis numerosis longitudinalibus, granosis lineis decussatis; propè suturam carinâ subnodosâ instructâ; labro intùs lævi; aperturâ lineari, in canali brevi recurvo desinente.* Axis 20 lin.

Hab. Veragua, Central America; in eighteen fathoms. Panama; in from eight to thirty fathoms; mud.

Clavatula Sinensis. *Clav. testâ fusiformi, acuminatâ, corneâ; anfractibus undenis, subplanulatis, medio costulatis, lineis fuscis decussatis; suturâ granoso-carinatâ; labro intùs lævi; aperturâ ovali; canali mediocri.* Axis 9 lin.

Hab. New Guinea; Straits of Macassar; China Sea. In from five to twenty-one fathoms; mud.

Clavatula spicata. *Clav. testâ fusiformi, albidâ; anfractibus octonis, costulatis, transversim striatis; costulis subacutis; suturâ*

granulosâ; labro intùs lævi, aperturâ lineari; canali brevi; anfractûs ultimi dorso fusco picto. Axis 6 lin.

Hab. Bow Island. Among the fine coral sand.

CLAVATULA ROBUSTA. *Clav. testâ fusiformi, acuminatâ, albidâ; anfractibus undenis, lævigatis, angulatè costulatis, lineis elevatis decussatis; costulis propè mediam angulatis; suturâ simplici; labro crenato, intùs lævi; aperturâ ovali; canali mediocri.* Axis 8 lin.

Hab. Hong-Kong, China. In from four to seven fathoms; sandy mud.

CLAVATULA SPURCA. *Clav. testâ ovatâ, acuminatâ; anfractibus octonis, rotundatis, costulatis, lineis duabus vel tribus elevatis fuscis decussatis, minutissimè transversim striatis; suturâ simplici, labro juxtà incrassato, intùs crenulato; aperturâ ovali; canali mediocri.* Axis 5 lin.

Hab. New Guinea; Straits of Malacca. In from five to eighteen fathoms; mud.

CLAVATULA RAVA. *Clav. testâ ovatâ, acuminatâ; anfractibus octonis, rotundatis, costulatis, transversim striatis; costulis rotundatis, suturam incurrentibus; infrà suturam purpureo spiraliter fasciatâ, anfractu ultimo iteratâ; labro intùs crenulato; aperturâ ovali; canali brevi.* Axis 5 lin.

Hab. Gulf of Nicoya, Central America. In eighteen fathoms; mud.

CLAVATULA ERICEA. *Clav. testâ fusiformi, acuminatâ, pallidâ, nitidâ; anfractibus octonis, rotundatis, costulatis; costulis granulosis lineis elevatis decussatis, suturam incurrentibus; interstitiis lævigatis; suturâ simplici; labro juxtà incrassato, intùs lævi; aperturâ subovali; canali brevi.* Axis 5 lin.

Hab. Magnetic Island, Coast of Veragua. From twenty-six fathoms; mud.

CLAVATULA DEBILIS. *Clav. testâ fusiformi, elongatâ, acuminatâ, gracili; anfractibus octonis, rotundatis, costulatis, transversim striatis; costulis parvis, rotundatis, approximatis, suturam incurrentibus; suturâ simplici; labro intùs crenulato; aperturâ obliquâ; sinu laterali propè suturam; canali mediocri.* Axis $4\frac{1}{2}$ lin.

Hab. New Guinea; Straits of Macassar.

CLAVATULA SCALARIS. *Clav. testâ fusiformi, acuminatâ; anfractibus septenis, rotundatis, scalariformibus, transversim striatis; costulis rotundatis, distantibus, suturam incurrentibus; suturâ simplici; labro arcuato, intùs lævi; sinu laterali propè suturam; aperturâ ovali; canali brevi.* Axis 7 lin.

Hab. Straits of Macassar. In twelve fathoms; coarse sand.

CLAVATULA SCULPTA. *Clav. testâ fusiformi, elongatâ, acuminatâ; anfractibus decenis, rotundatis, costulatis, transversim striatis, fusco fasciatis; costulis rotundatis, propè suturam desinentibus, suturâ striis arcuatis instructâ; sinu laterali propè suturam, marginibus acutis; aperturâ ovali; canali mediocri.* Axis 7 lin.

Hab. Panama. From seven fathoms; mud.

Clavatula amabilis. *Clav. testâ ovatâ, turritâ, pallidè aurantiacâ; anfractibus septenis, subrotundatis, costulatis, transversim striatis; costulis rotundatis, subdistantibus; suturâ maculis albis ornatâ; anfractu ultimo fasciâ albâ angustâ cincto; sinu laterali pone suturam; aperturâ ovali; canali mediocri.* Axis 3½ lin.

Hab. Straits of Malacca. From seventeen fathoms; mud.

Clavatula cinerea. *Clav. testâ ovatâ, acuminatâ, anfractibus septenis, longitudinaliter tuberculato-costatis, transversim striatis; costulis anfractûs ultimi furcatis; suturâ lineis arcuatis instructâ; labro incrassato intùs et cum columellâ crenulato; aperturâ ovali, obliquâ; canali breviusculâ.* Axis 8 lin.

Hab. —— ?

Clavatula argillacea. *Clav. testâ ovatâ, acuminatâ, lævigatâ, corneâ; anfractibus septenis, tuberculato-costatis; costulis supernè angulatis, anfractûs ultimi evanidis; sinu laterali magno; labro incrassato intùs et cum columellâ crenulato; aperturâ ovali, elongatâ; canali breviusculo.* Axis 6 lin.

Hab. Straits of Malacca. From 17 fathoms; mud.

Clavatula rubida. *Clav. testâ ovatâ, acuminatâ, rufâ, anfractibus septenis, rotundatis, costatis, transversim striatis; costis rotundatis, latis, suturam simplicem incurrentibus, labro subincurvo, intùs dentato; aperturâ ovali, oblongâ, sinu laterali propè suturam; canali brevi.* Axis 7 lin.

Var. *Nigro et albo fasciata.*

Hab. New Guinea. From seven fathoms; mud. The variety is from New Ireland: among coarse sand at low water. Also collected by Mr. Cuming at the Philippines.

Clavatula luctuosa. *Clav. testâ ovatâ, acuminatâ, nigricante, crassâ; anfractibus nonis, lævigatis, supernè subplanulatis, propè mediam uniseriatim tuberculatis; suturâ simplici; sinu laterali posticali; labro paululùm incrassato, intùs lævi; aperturâ fuscâ, ovali; canali brevi.* Axis 7½ lin.

Hab. Bay of Guayaquil; Gulf of Magdalena, California. In from five to twenty-two fathoms.

Clavatula aspera. *Clav. testâ subclavatâ, acuminatâ, fuscâ vel nigricante; anfractibus septenis, rotundatis, costulatis, lineis elevatis decussatis; suturâ lineâ elevatâ instructâ; labro paululùm incrassato, intùs lævi; aperturâ fuscâ, ovali; canali brevi.* Axis 4 lin.

Hab. Guayaquil. In five fathoms; mud. North coast of New Guinea.

Clavatula crebricostata. *Clav. testâ ovatâ, acuminatâ; anfractibus senis, pliciferis, albidis, supernè fusco fasciatis; plicis parvis, numerosissimis, obliquis, confertis; suturâ simplici; sinu laterali amplo; labro tenui, acuto, intùs lævi; aperturâ latè ovali; canali subnullo.* Axis 3 lin.

Hab. Cape Blanco, Africa. In seventeen fathoms.

Clavatula plumbea. *Clav. testâ ovatâ, attenuatâ, lævigatâ, pallidâ, fusco fasciatâ; anfractibus septenis, subrotundatis, costulatis;*

costulis rotundatis, numerosis, suturam simplicem incurrentibus; anfractu ultimo fasciis duabus cinctis, labro intùs lævi, aperturâ ovali. Axis 5 lin.

Hab. Bay of Magdalena, California. From five fathoms.

Clavatula occata. *Clav. testâ fusiformi, attenuatâ, gracili, corneâ, angulatè costatâ; anfractibus septenis, transversim exaratis; suturâ simplici; aperturâ brevi, lineari; canali mediocri.* Axis $4\frac{1}{2}$ lin.

Hab. Magnetic Island, west coast of Veragua.

Clavatula bella. *Clav. testâ fusiformi, attenuatâ, gracili, lævigatâ, pallidè fuscâ; anfractibus octonis, rotundatis, costulatis, lineis albidis elevatis decussatis, supernè fusco fasciatis, ultimo attenuato; costulis gracilibus, granulis parvis sparsis instructis, suturam simplicem incurrentibus; labro intùs lævi; aperturâ ovali, in canali brevi attenuato.* Axis $5\frac{1}{2}$ lin.

Hab. West coast of Veragua: from thirty fathoms; mud. Gulf of Papagayo, Central America: from eight to fourteen fathoms; mud.

Clavatula pudica. *Clav. testâ fusiformi, acuminatâ, nitidissimâ; anfractibus nonis, albidis, propè suturam paululùm lævigatis, infernè tuberculato-costulatis; costulis obliquis, acutis; suturâ simplici; anfractu ultimo anticè costulis acutis obliquis instructo, posticè lævigato maculâ amplâ fuscâ picto; sinu laterali profundo; labro acuto, intùs lævi; aperturâ ovali; canali mediocri effusâ.* Axis 6 lin.

Hab. Gulf of Papagayo, Central America. From eight to fourteen fathoms; mud.

Clavatula læta. *Clav. testâ subclavatâ, acuminatâ, nitidissimâ; anfractibus nonis, supernè planulatis, medio uniseriatim tuberculatis, ultimâ serie secundâ parvâ; tuberculis distinctis, erectis, subacutis; suturâ simplici; labro acuto, intùs lævi; aperturâ ovali; canali brevi, effuso.* Axis 6 lin.

Hab. New Guinea; Straits of Macassar. From seven to ten fathoms.

Clavatula nitens. *Clav. testâ clavatâ, excentricâ, fuscâ, nitidissimâ; anfractibus octonis, subangulatè costulatis, propè mediam prominentibus; costulis obliquis, acutis, suturam simplicem incurrentibus; labro acuto, intùs lævi; aperturâ latè ovali; canali brevi.* Axis $5\frac{1}{2}$ lin.

Hab. New Guinea; Straits of Macassar and Malacca. From seven to twenty-two fathoms.

Clavatula candida. *Clav. testâ fusiformi, acuminatâ, candidâ; anfractibus septenis, costulatis, supernè subangulatis; suturâ simplici; aperturâ ovali, sinu laterali supernè valdè calloso, faucibus crenulatis; anfractûs ultimi basi transversim striato.* Axis $5\frac{1}{2}$ lin.

Hab. Magnetic Island, coast of Veragua.

Clavatula pyramis. *Clav. testâ clavatâ, angulatè costatâ, hexa-*

gonâ, transversim creberrimè striatâ; sinu laterali superficiali; aperturâ brevi, sublineari; canali brevi. Axis 4 lin.

Hab. Straits of Macassar.

Clavatula merita. *Clav. testâ ovatâ, turritâ, acuminatâ, lævigatâ, pallidâ; anfractibus senis, plico-costulatis, supernè angulatis et lineâ fuscâ spiraliter cinctis; suturâ simplici; anfractûs ultimi dorso fusco nebuloso, transversim striato; labro acuto, intùs lævi; aperturâ oblongâ; canali subnullo.* Axis 4 lin.

Hab. Gulf of Nicoya, Central America. Under stones at low water.

Clavatula flammea. *Clav. testâ clavatâ, albidâ; anfractibus octonis, rotundatis, transversim striatis, flammulis fuscis, supernè angulatis, infernè subrectis, ornatis; spirâ ecostulatâ; suturâ simplici; sinu laterali modo emarginaturâ; labro obtuso, lævissimè crenulato, intùs lævi; aperturâ ad basin dilatatâ; canali brevi, lato, recurvo.* Axis 7 lin.

Hab. New Ireland. Among coarse sand at low water.

Clavatula felina. *Clav. testâ ovatâ, acuminatâ; anfractibus senis, subrotundatis, granulosis lineis transversis et longitudinalibus decussatis, maculis rufis quadratis et oblongis eleganter ornatis; suturâ simplici; labro crenulato, subrecto; aperturâ oblongâ; canali brevi.*

Hab. New Ireland. Among coarse sand at low water.

Clavatula pardalis. *Clav. testâ ovatâ, lævigatâ, nigricante; costulis fulvis apice ad basin decurrentibus; interstitiis striatâ; aperturâ oblongâ, labro intùs crenulato; canali brevi.* Axis 2 lin.

Hab. Gulf of Nicoya. Under stones at low water.

Clavatula cœlata. *Clav. testâ ovatâ, elongatâ, atro-fuscâ; anfractibus octonis, rotundatis, costulatis; costulis obliquis, acutis; suturâ lineâ elevatâ instructâ; aperturâ atrâ, ovali; labro intùs lævi; canali brevi.* Axis 3 lin.

Hab. Gulf of Fonseca. From twenty fathoms; mud.

Clavatula papillaris. *Clav. testâ oblongâ, lævigatâ, pallidâ; anfractibus quinis, rotundatis, obsoletè tuberculato-costulatis; apice papilloso; suturâ simplici; aperturâ brevi, ovatâ; labro intùs lævi; canali subnullo.* Axis $2\frac{1}{2}$ lin.

Hab. Straits of Malacca. From seventeen fathoms; mud.

Clavatula rubiginosa. *Clav. testâ oblongâ, corneâ; anfractibus senis, subrotundatis, transversim striatis; suturâ simplici; aperturâ brevi, ovatâ, corneâ; labro intùs lævi; canali subnullo.* Axis 3 lin.

Hab. Straits of Malacca. From seventeen fathoms; mud.

Clavatula polita. *Clav. testâ valdè fusiformi, politâ, albidâ; septangulatè costulatâ; costulis confluentibus; suturâ simplici; aperturâ ovali, oblongâ; labro acuto, intùs lævi; canali longo, subrecurvo.* Axis 5 lin.

Hab. Straits of Macassar. Found among coarse sand in seven fathoms.

Clavatula textilis. *Clav. testâ ellipticâ, acuminatâ, albidâ, anfractibus senis, costulatis, supernè angulatis; costulis rotundatis lineis elevatis decussatis, tribus propè mediam anfractûs ultimi fuscis; sinu laterali postico; aperturâ sublineari; labro intùs crenulato; canali brevi.* Axis $3\frac{1}{2}$ lin.

Hab. Straits of Macassar. From seven fathoms; sand.

Clavatula fimbriata. *Clav. testâ ovatâ, pallidè rufâ, albo fasciatâ; anfractibus quinis, rotundatis, laminis brevibus, numerosis, dentatis, reflexis indutis; suturâ simplici; aperturâ ovali; sinu laterali minimo; labro crenulato, reflexo; canali brevi.* Axis $3\frac{1}{2}$ lin.

Hab. North coast of New Guinea. From twenty-two fathoms; mud.

Clavatula donata. *Clav. testâ ovatâ, elongatâ, roseâ; anfractibus octonis, costulatis, transversim striatis; costulis brevibus, rotundatis; suturâ lineâ nodosâ instructâ; aperturâ parvâ, ovali, roseâ; labro intùs lævi; canali brevi.* Axis $3\frac{1}{2}$ lin.

Hab. North coast of New Guinea. From twenty-two fathoms; mud.

Clavatula micans. *Clav. testâ ovatâ, elongatâ, corneâ, nitidâ; anfractibus octonis, costulatis; costulis subacutis, albidis, obliquis. supernè propè suturam evanidis; anfractûs ultimi dorso ecostulato; aperturâ parvâ, ovali; labro tenui, acuto, intùs lævi; canali brevi.* Axis $3\frac{1}{2}$ lin.

Hab. Gulf of Papagayo. From fourteen fathoms; mud.

Clavatula albicans. *Clav. testâ ovatâ, elongatâ, albidâ, nitidâ; anfractibus octonis, costulatis; costulis supernè subnodulosis; suturâ nodulosâ; sinu laterali pone suturam; aperturâ parvâ, ovali; labro acuto, intùs lævi; canali brevi.* Axis $2\frac{1}{2}$ lin.

Hab. Straits of Malacca. From seventeen fathoms; mud.

Clavatula mutica. *Clav. testâ subfusiformi, pallidè fulvâ; anfractibus senis, rotundatis, transversim striatis, maculis fuscis longitudinalibus ornatis; suturâ simplici; anfractu ultimo medio angulato et albo fasciato, ad basin fusco; sinu laterali juxtà suturam; aperturâ ovali; labro acuto, intùs lævi; canali brevi.* Axis $3\frac{1}{2}$ lin.

Hab. Straits of Malacca. From seventeen fathoms; mud.

Clavatula metula. *Clav. testâ ovatâ, acuminatâ; anfractibus quinis planulatis, obsoletè costulatis, transversim striatis, pallidè rufo fasciatis; suturâ lineâ elevatâ instructâ; aperturâ lineari; labro subinflexo; canali subnullo.* Axis 2 lin.

Hab. ——?

Clavatula tessellata. *Clav. testâ elongatâ, acuminatâ; anfractibus senis, subplanulatis, granulosis lineis longitudinalibus et transversis decussatis, maculis subquadratis fuscis pictis; suturâ simplici; aperturâ oblongâ; labro intùs crenulato; canali brevi.* Axis 3 lin.

Hab. Straits of Macassar. From ten fathoms; coarse sand.

Clavatula fulva. *Clav. testâ ovatâ, acuminatâ, fulvâ; anfracti-*

bus senis, granulosis, tuberculato-costulatis, supernè angulatis; suturâ linea granulosâ instructâ; aperturâ parvâ, oblongâ; labro intùs lævi; canali brevi effuso. Axis $2\frac{1}{2}$ lin.

Hab. Straits of Macassar. From ten fathoms; coarse sand.

CLAVATULA DENTIFERA. *Clav. testâ elongatâ, acuminatâ; anfractibus quinis, costulatis, lineis transversis decussatis; costulis numerosis, parvis, angustis, suturam incurrentibus; aperturâ oblongâ; labro crenulato, infernè dilatato et dentifero; columellâ infernè dente parvo; canali breviusculo.* Axis 3 lin.

Hab. North coast of New Guinea; Straits of Malacca. From five to seventeen fathoms; mud.

CLAVATULA GLUMACEA. *Clav. testâ elongatâ, pallidâ, nitidâ; anfractibus senis costulatis, transversim striatis; costulis brevibus, rotundatis, suturam simplicem incurrentibus; aperturâ oblongâ, fuscâ; labro intùs lævi; canali breviusculo.* Axis 3 lin.

Hab. North coast of New Guinea. From twenty-two fathoms; mud.

CLAVATULA QUISQUALIS. *Clav. testâ fusiformi, acuminatâ, nitidissimâ; anfractibus octonis, supernè lævigatis, infernè costulatis; costulis brevibus, obliquis, acutis; lineis albis sinuosis longitudinaliter instructis; aperturâ ovatâ; sinu laterali rotundo; labro tenui, acuto, intùs lævi; columellâ marginatâ; canali brevi, effuso, recurvo.* Axis $4\frac{1}{2}$ lin.

Hab. Gulf of Papagayo, Central America. From eight to fourteen fathoms; mud.

CLAVATULA RETUSA. *Clav. testâ parvâ, obesâ, aurantiacâ; anfractibus septenis, costulatis, transversim striatis; costulis rotundatis, confertis; spirâ conicâ; suturâ simplici; apice purpureo; aperturâ oblongâ; columellâ contortâ; canali breviusculo.* Axis $2\frac{1}{2}$ lin.

Hab. Straits of Macassar. From ten fathoms; coarse sand.

CLAVATULA IMPRESSA. *Clav. testâ fusiformi, acuminatâ, roseâ; anfractibus nonis, tuberculato-costatis, transversim striatis; costulis acutis, obliquis, albidis; anfractûs ultimi dorso picto, ecostulato; aperturâ ovali; labro tenui, acuto, intùs lævi; canali mediocri.* Axis $4\frac{1}{2}$ lin.

Hab. Gulf of Papagayo, Central America. From eight to fourteen fathoms; mud.

CLAVATULA NEGLECTA. *Clav. testâ fusiformi, gracili, fuscâ; anfractibus nonis, costulatis, lineis elevatis decussatis; costulis brevibus, rotundatis; suturâ lineâ elevatâ instructâ, infrà propè lævigatâ; aperturâ ovatâ, obliquâ; sinu laterali pone suturam; labro incrassato, inflexo; canali mediocri.* Axis 5 lin.

Hab. Gulf of Nicoya, Central America. Under stones at low water.

CLAVATULA RIGIDA. *Clav. testâ ovatâ, retusâ; anfractibus quinis, costulatis, supernè angulatis, transversim striatis; suturâ simplici; aperturâ oblongâ, labro crenulato; columellâ rugosâ; canali brevi.* Axis $2\frac{1}{2}$ lin.

Hab. Panama.

MANGELIA, Leach.

The shells of this group are distinguished by their small size, oval and attenuated shape, long linear mouth, terminated in a short canal, very slightly recurved; outer lip nearly straight, the immediate margin acute, but strengthened by the last-formed rib; above shouldered, with a slight emargination, which does not admit of being called a sinus, and with the margin not callous; apparently not formed before the full development of the shell; inner lip slightly produced; suture always simple; last whorl not at all inflated, and occupying one-half or more of the entire length; sculpture consisting of longitudinal fold-like ribs, terminating at the suture; very probably without an operculum, as Philippi observes that the animal of *Pleurotoma Bertrandi*, which belongs to this genus, is not provided with one. Restricted in this manner, a number of shells may be separated with advantage from the now bulky and somewhat incongruous genus *Pleurotoma*; and in this discrimination I have kept in view the *Mangelia Goodalii* of Leach, but have been by no means guided by the genus, as adopted by Risso.

MANGELIA CINNAMOMEA. *Mang. testâ attenuatâ, nitidâ, cinnamomeâ, albo fasciatâ; anfractibus senis, plico-costulatis, transversim lævissimè striatis; faucibus crenulatis.* Axis $4\frac{1}{2}$ lin.

Hab. North coast of New Guinea; Straits of Macassar; Straits of Malacca. From five to twenty-two fathoms; mud.

MANGELIA CORONATA. *Mang. testâ attenuatâ, acuminatâ; anfractibus senis, plico-costulatis, transversim striatis; costulis supernè subacuminatis; faucibus lævibus.* Axis 4 lin.

Hab. Straits of Macassar.

MANGELIA VITTATA. *Mang. testâ attenuatâ, pallidâ, fusco fasciatâ; anfractibus senis, plico-costulatis, transversim striatis; costulis numerosis; faucibus crenulatis.* Axis $3\frac{1}{2}$ lin.

Hab. Straits of Macassar. From ten fathoms; coarse sand.

MANGELIA ORIZA. *Mang. testâ attenuatâ, acuminatâ, lævigatâ, nitidâ, hexagonè plico-costulatâ; anfractibus septenis; faucibus lævibus.* Axis $4\frac{1}{2}$ lin.

Hab. North coast of New Guinea. From twenty-two fathoms; mud.

MANGELIA CELEBENSIS. *Mang. testâ attenuatâ, lævigatâ, pallidâ, fusco latè fasciatâ; anfractibus senis, plico-costulatis; costulis subdistantibus; faucibus crenulatis.* Axis $3\frac{1}{2}$ lin.

Hab. Straits of Macassar. From ten fathoms; mud.

Mr. Reeve then communicated his description of a new species of *Cyclostoma*, from the Cordilleras Mountains.

CYCLOSTOMA STRAMINEUM. *Cycl. testâ orbiculari, subdepressâ, stramineo-luteâ, spirâ versus apicem rosaceâ; usquequaque elegantissimè striatâ, striis, ab umbilico exorientibus, diagonaliter collocatis; aperturâ ferè circulari, supernè subsinuatâ, peritremate simplici; operculo testaceo, albo, multi-spirali.*

Icon. Sowerby, Thesaurus Conch., pl. xxix. f. 211, 212.

Hab. Ad Meridam, Columbiæ Occidentalis. From the collection of H. Cuming, Esq.

This very peculiarly striated shell was lately found by a gentleman whilst searching for Orchidaceous plants at the base of the Cordilleras Mountains.

GEOLOGICAL SOCIETY.

April 5, 1843.—"Notice of the occurrence of Beds containing Freshwater Fossils in the Oolitic Coal-field of Brora, Sutherlandshire." By Alexander Robertson, Esq., F.G.S.

Among the reefs of shale and coal opposite the old salt-pans at Brora, Mr. Robertson has discovered two beds abounding in *Cyclas* and other freshwater fossils, approachable only at low water. The rise of the tide on the occasion of his visit to the locality, prevented a minute examination of their relations. Their position was however satisfactorily made out, and is, in the descending order, as follows:—

a. Beds of calcareous sandstone, considered by Mr. Phillips to represent the gray limestone of Cloughton and other localities in Yorkshire.

b. Shale and coal, several feet.

c. *Shale with fossils about an inch.*

d. Shale and coal similar to the beds *b*, two or three feet.

e. *Clay with fossils about thirteen inches.*

f. Shale with a few plants.

The bed *c* has yielded,—

Fishes.—Scales of a species of *Lepidotus*, strongly resembling *L. fimbriatus*, Ag. Scale of *Megalurus*?

Mollusca, Paludina, several new species. *Cyclas*, one or two new species.

Crustacea.—*Cypris*, new species. Plant, obscure impressions.

From the bed *e* the following have been obtained:—

Fishes.—Scales of two or three species of *Lepidotus*. Teeth of *Acrodus minimus*, Ag.? Teeth of *Hybodus minimus*, Ag.

Mollusca.—*Paludina*, same species as in the upper bed. Two or three species of *Perna*, some of which are probably new. *Unio*, one new species. *Cyclas* numerous, new species chiefly belonging to Lamarck's genus *Cyrena**.

Crustacea.—*Cypris*, same species as in the upper bed.

Plants.—Minute fragments of carbonized wood.

Nearly the whole mass of both beds consists of fossils. No marine fossils (with the exception perhaps of the scales of *Lepidotus*) are found in the upper bed, and it seems therefore to be properly a freshwater deposit. The mixed nature of the fossils of the lower one conclusively point out its estuary character.

* Among the specimens sent to the Society by Mr. Robertson were several examples of *Cyclas media*, identical with the Wealden shell. The *Perna* referred to is altogether new, and will probably form the type of a genus, bearing a relation to *Perna* analogous with that which *Dreissena* bears to *Mytilus*.

"Observations on the occurrence of Freshwater Beds in the Oolitic Deposits of Brora, Sutherlandshire; and on the British Equivalents of the Neocomian System of Foreign Geologists." By Roderick Impey Murchison, Esq., F.G.S.

In this communication the author confirms the interesting discovery announced by Mr. Robertson in the preceding paper, and remarks, that as the reefs of rock exposed at low water at the mouth of the river Brora unquestionably lie beneath the Oxford clay, and are not far above the roof of the coal, there can be no doubt that the beds containing the freshwater shells, being fairly intercalated with the other strata, are thus inclosed in the heart of the oolitic series. They had escaped the notice of Mr. Murchison, probably from having been covered by sea sand at the time of his visit.

An examination of the freshwater specimens collected by Mr. Murchison and Professor Sedgwick at Loch Staffin, in the Isle of Skye, has identified the principal forms with Mr. Robertson's specimens from Brora, and has led the author to adopt a different view respecting the position of the beds from which they were derived. Instead of supposing that the oolitic series of the cliffs near Portree was overlaid by a true equivalent of the Wealden*, the freshwater beds of Skye will it is now believed be found, like those of Inverbrora, to be interstratified with the middle oolite, a conclusion rendered probable by the natural sections and form of the coast, and by the circumstance that the fragments not found *in situ* which contained freshwater shells were collected near the escarpment and not on the dip of the oolitic strata. Mr. Murchison is inclined to take a similar view of the freshwater deposits near Elgin, compared by Mr. Malcolmson to the Purbeck beds of England.

The author remarks, that with the terrestrial evidences in the plants of Portland, Scarborough, Stonesfield and Brora, we might naturally expect at any day to hear of the associated lacustrine or river shells. But Mr. Robertson's discovery further compels us to believe, that the same species of freshwater shells prevailed, not only during the whole of the Wealden epoch, but that they were in existence at periods long antecedent, when the adjacent lands poured forth rivers into the sea in which the middle and lower oolites were accumulated, and thus we acquire a new element to enable us to reason upon the former conditions of the surface.

The facts stated by Mr. Robertson tend to confirm the idea, that the Wealden is more naturally connected with the Jurassic than with the cretaceous system, and must also have an influence in deciding that the Neocomian formation of foreign geologists ought not to be placed on the parallel of the Wealden. Mr. Murchison has for some years been of opinion that the Neocomian system is little more than an equivalent of the lower greensand of British geologists, a view which he upheld at the meeting of the Geological Society of France at Boulogne in 1839, on the ground of the identity of their stratigraphical relations and typical fossils. Further researches during last May along the coast of the Isle of Wight, in company with

* Geol. Trans. vol. ii. p. 366.

Count Keyserling, led both that gentleman and the author to the same conclusion. Among the numerous fossils they there collected were many identical with, or analogous to, Neocomian species, particularly in that portion of the coast section so minutely described by Dr. Fitton and Sir John Herschel, viz. between Black Gang Chine and Atherfield rocks. Mr. Murchison observed that there seemed to be a gradual zoological as well as lithological passage from the Wealden beds below into the greensand and shales above them; for although the shale with *Cypris* occurs immediately beneath the marine deposit of Atherfield rocks, as remarked by Dr. Fitton, another band of flagstone with marine shells (*Ostrea* and *Terebratula*) also occurs beneath these uppermost beds of *Cypris*. In the still lower strata, however, we lose all traces of such marine alternations, and the whole becomes one great freshwater deposit. A similar phænomenon is seen in the southern part of the section at Red Cliff, extending into Sandown Bay, where beds with *Cypris* are intercalated between oyster beds. These alternations are indeed what we might expect to find, provided a former depression of the surface had converted a lake into an estuary, and subsequently into a marine bay. But notwithstanding the natural connexion between the Wealden and the lower greensand, it does not follow that the two formations ought to be merged in one system or natural series. Dr. Mantell as long ago as 1822 pointed out the analogy between the animals of the Wealden and those of the Stonesfield beds; and more recently Professor Owen has carried it out much further. Professor Agassiz has pronounced the Ichthyolites of the cretaceous system to be entirely dissimilar from those of the Wealden.

Mr. Murchison inquires, where are we to draw the line of separation which shall indicate precisely in our own country the base of the Neocomian of foreign geologists, or in other words, the base of the great continental cretaceous system? On this point he remarks that some small amount of compromise may eventually be found desirable; for whilst we have on the one hand full right to infer that the larger portion of the Wealden must be classed in the oolitic series, further inquiry may convince us that its uppermost part is of the same age as the lowest Neocomian strata; and thus we may connect that portion of it with the cretaceous system. In the mean time it is quite clear that a great part of the Neocomian is absolutely the lower greensand itself. This view is confirmed by Count Keyserling, who has identified fossils from the Neocomian strata of Kyslavodsk in the Caucasus, with specimens collected by him in company with Mr. Murchison in the lower greensand of the Isle of Wight.

April 26.—A paper was read "On the upright Fossil-trees found at different levels in the Coal strata of Cumberland, Nova Scotia." By Charles Lyell, Esq., F.G.S. &c.

The first notice of these fossil trees was published in 1829 by Mr. Richard Brown, in Haliburton's 'Nova Scotia,' at which time the erect trunks are described as extending through one bed of sandstone, twelve feet thick. Their fossilization was attributed by

Mr. Brown to the inundation of the ground on which the forest stood. Mr. Lyell in 1842 saw similar upright trees at more than ten different levels, all placed at right angles to the planes of stratification, which are inclined at an angle of 24° to the S.S.W. The fossil trees extend over a space of from two to three miles from north to south, and, acccording to Dr. Gesner, to more than twice that distance from east to west. The containing strata resemble lithologically the English coal-measures, being composed of white and brown sandstones, bituminous shales, and clay with ironstone. There are about nineteen seams of coal, the most considerable being four feet thick. The place where these are best seen is called the South Joggins, where the cliffs are from 150 to 200 feet high, forming the southern shore of a branch of the Bay of Fundy, called Chignecto Bay. The action of the tides, which rise sixty feet, exposes continually a fresh section, and every year different sets of trees are seen in the face of the cliffs.

The beds with which the coal and erect trees are associated are not interrupted by faults. They are more than 2000 feet thick, and range for nearly two miles along the coast. Immediately below them are blue grits used for grindstones, after which there is a break in the section for three miles, when there appear near Minudie beds of gypsum and limestone, and at that village a deep red sandstone, the whole having the same southerly dip as the coal at the Joggins, and being considered by Mr. Lyell as the older member of the carboniferous series.

Above the coal-bearing beds, and stretching southwards for many miles continuously along the shore, are grits and shales of prodigious thickness, with coal-plants, but without vertical trees.

Mr. Lyell next describes in detail the position and structure of the upright trees at the South Joggins. He states that no part of the original tree is preserved except the bark, which is marked externally with irregular longitudinal ridges and furrows, without any leaf-scars, precisely resembling in this respect the vertical trees found at Dixonfold on the Bolton Railway, described by Messrs. Hawkshaw and Bowman. No trace of structure could be detected in the internal cylinder of the fossil trunks, which are now filled with sandstone and shale, through which fern-leaves and other plants are scattered. Mr. Lyell saw seventeen vertical trees, varying in height from six to twenty feet, and from fourteen inches to four feet in diameter. The beds which inclose the fossil trees are usually separated from each other by masses of shale and sandstone many yards in thickness. The trunks of the trees, which are all broken off abruptly at the top, extend through different strata, but were never seen to penetrate a seam of coal, however thin. They all end downwards either in beds of coal or shale, no instance occurring of their termination in sandstone. Sometimes the strata of shale, sandstone and clay, with which the fossil trunks have been filled, are much more numerous than the beds which they traverse. In one case nine distinct deposits were seen in the interior of a tree, while only three occurred on the outside in the same vertical height.

Immediately above the uppermost coal-seams and vertical trees are two strata, probably of freshwater origin, of black calcareo-bituminous shale, chiefly made up of compressed shells of two species of *Modiola*, and two kinds of *Cypris*.

Stigmariæ are abundant in the clays and argillaceous sandstones; often with their leaves attached, and spreading regularly in all directions from the stem. The other plants dispersed through the shales and sandstones bear a striking resemblance to those of the European coal-fields. Among these are *Pecopteris lonchitica*, *Neuropteris flexuosa* ?, *Calamites cannæformis*, *C. approximatus*, *C. Steinhaueri*, *C. nodosus*, *Sigillaria undulata*, and another species.

The genera *Lepidodendron* and *Sternbergia* are also present. The same plants occur at Pictou and at Sydney in Cape Breton, accompanied with *Trigonocarpum*, *Asterophyllites*, *Sphænophyllum*, and other well-known coal fossils.

The author then gives a brief description of a bed of erect *Calamites*, first discovered by Mr. J. Dawson in the Pictou coal-field, about 100 miles eastward of the Cumberland coal-measures before described. They occur at Dickson's mills, $1\frac{1}{4}$ mile west of Pictou, in a bed of sandstone about ten feet thick. They all terminate downwards at the same level where the sandstone rests on subjacent limestone; but the tops are broken off at different heights, and Mr. Dawson observed in the same bed a prostrate *Lepidodendron*, with leaves and *Lepidostrobi* attached to its branches.

From the facts above enumerated, Mr. Lyell draws the following conclusions:—

1. That the erect position of the trees, and their perpendicularity to the planes of stratification, imply that a thickness of several thousand feet of coal strata, now uniformly inclined at an angle of 24°, were deposited originally in a horizontal position.

2. There must have been repeated sinkings of the dry land to allow of the growth of more than ten forests of fossil trees one above the other, an inference which is borne out by the independent evidence afforded by the *Stigmaria*, found in the underclays beneath coal-seams in Nova Scotia, as first noticed in South Wales by Mr. Logan.

3. The correspondence in general characters of the erect trees of Nova Scotia with those found near Manchester, leads to the opinion that this tribe of plants may have been enabled by the strength of its large roots to withstand the power of waves and currents much more effectually than the *Lepidodendra* and other coal plants more rarely found in a perpendicular position.

Lastly, it has been objected, that if seams of pure coal were formed on the ground where the vegetables grew, they would not bear so precise a resemblance to ordinary subaqueous strata, but ought to undulate like the present surface of the dry land. In answer to this Mr. Lyell points to what were undoubtedly terrestrial surfaces at the South Joggins, now represented by coal seams or layers of shale supporting erect trees, and yet these surfaces conform as correctly to the general planes of stratification as those of any other strata.

He also shows that such an absence of superficial inequalities,

and such a parallelism of successive surfaces of dry land, ought to be expected, according to the theory of repeated subsidence, because sedimentary deposition would continually exert its leveling action on the district submerged.

May 10.—A paper was read "On some new Ganoid Fishes." By Sir Philip Grey Egerton, M.P., F.G.S.

The specific characters of the fishes described are as follows:—

1. *Semionotus Pentlandi*, Egerton.—Body deep; pedicle of the tail thicker proportionally than in *Semionotus latus*. Anal fin long, with 5 or 6 rays, articulated, subdivided, and decreasing in length from the first. Bases distant; 3 or 4 fulcral rays on the margin. Caudal fin large; upper lobe invested with scales for some distance. Margins fringed by elongated imbricated scales. Rays: 20, articulated, subdivided. Bases at greater intervals near the centre. Scales rhomboidal, smooth, with entire margins. Stratum, Lias.

Found by Mr. Pentland in a black bituminous schist at Giffoni, near Castella Mare. In the cabinets of the Earl of Enniskillen and Sir Philip Egerton.

Of the six species of *Semionotus* described by Professor Agassiz, one is from the quader-sandstein, the other five from the lias of Lufeld, Boll, Lyme Regis, and Schoven in Sweden. From a comparison of Mr. Pentland's specimens of this and the two following species with all those described, Sir Philip Egerton considers they approximate more nearly the species of the lias than those of the greensand, and infers from this zoological evidence that the Giffoni beds belong to the former.

2. *Semionotus pustulifer*, Egerton.—Fish large; operculum arenated; humerus and scapula pustulated; scales thick and lustrous; surfaces slightly uneven; upper and lower margins deeply undulate. Stratum, Lias; found with last. Cab. Egerton.

3. *Semionotus minutus*, Egerton.—Fish small; body slender; caudal pedicle thick; scales extended over the upper lobe of the tail. Stratum, Lias; found with last. Cab. Egerton.

4. *Lepidotus pectinatus*, Egerton.—Fish oblong, subfusiform; length 9 inches; depth $2\frac{3}{4}$; head small; fins small; scales marked with delicate radiating striæ; posterior margin finely pectinate; upper edge convex, lower one concave; dorsal, anal and caudal scales rhomboidal, with entire margins. Stratum, Lias. Locality, Whitby. Cab. Enniskillen.

5. *Pholidophorus Hartmanni*, Egerton.—Size of *Pholidophorus latiusculus*. Head rounded; orbit large; upper angle of operculum striated; preoperculum marked with few moniliform inequalities; humerus plicated; scales small, serrated on the posterior margin; its serrations decrease in number and increase in size on the posterior parts of the body. Stratum, Lias. Locality, Ohmden, in Wurtemburg. Cab. Enniskillen, Egerton.

6. *Pholidophorus crenulatus*, Egerton.—Rather larger than *Pholidophorus latiusculus*. Head rather pointed; humerus obliquely plaited; pectoral fins large, with 22 rays; caudal fins strong; the upper lobe bordered full two-thirds of its length with fulcral scales;

rays 28—30; scales ribbed vertically on their bases, furrowed horizontally on their exposed surface, and crenulated on the posterior margin; the ventral scales deeply incised. Stratum, Lias. Locality, Lyme Regis. Cab. Egerton.

June 7.—"On Ichthyopatolites, or petrified trackwings of ambulatory fishes upon sandstone of the Coal formation." By the Rev. W. Buckland, D.D., F.G.S.

These impressions were discovered by Miss Potts of Chester, on a flagstone near the shaft of a coal-pit at Mostyn in Flintshire, and were communicated by her to Dr. Buckland, with a remark on the novelty of footsteps in any stratum older than the new red sandstone. As they present no trace of any true foot to which long claws may have been attached, Dr. Buckland rejects the notion of their having been made by a reptile. They consist of curvilinear scratches disposed symmetrically at regular intervals on each side of a level space, about two inches wide, which in his opinion may represent the body of a fish, to the pectoral rays of which animal he attributes the scratches. They follow one another in nearly equidistant rows of three scratches in a row, and at intervals of about two inches from the point of each individual scratch to the points of those next succeeding and preceding it. They are all slightly convex outwards, three on each side of the median space, or supposed place of the body of the fish. Each external scratch is about one inch and a half in length; the inner ones are about half an inch, and the middle one about an inch long. These proportions are pretty constant through a series of eight successive rows of triple impressions on the slab from the Mostyn coal-pit. The impressions of the right and left fin-ray are not quite symmetrically opposed to each other on a straight line of progression; but the path of the animal appears to have been curvilinear, trending towards the right: each impression or scratch is deepest on its supposed frontal side, and becomes more shallow gradually backwards. All these conditions seem to agree with the hypothesis of their having been made by three bony processes projecting from the anterior rays of the pectoral fin of a fish. They are not consistent with conditions that would have accompanied the impressions of claws proceeding from the feet of any reptile.

Dr. Buckland refers to the structure of existing Siluroid and Lophoid fishes, and of the climbing perch (*Anabas scandens*), and Hassar (*Doras costata*), as bearing him out in the conclusions he has come to regarding those markings. He also refers to the observations of Prof. Deslonchamps, on the ambulatory movements under water of the common Gurnard, as confirmatory of his views. He has been informed of a slab of coal sandstone bearing similar markings in the museum of Sheffield; and remarks, that there are several fossil fishes of the carboniferous system approximating the characters of Gurnards, and capable of making such markings as those described.

"Observations on certain Fossiliferous beds in Southern India." By C. T. Kaye, Esq., F.G.S., of the Madras Civil Service.

The beds described in this paper are found at three localities; viz. Pondicherry, Verdachellum and Trinchinopoly.

1. *Pondicherry*.—This town, like Madras, is situated on a very recent formation of loose sand, which extends for a considerable distance along the eastern coast of India, and which in many places contains marine shells in such abundance that they are dug up and burnt for lime. They are all species which now inhabit the Indian seas, such as *Pyrula vespertilio, Purpura carinifera, Cardita antiquata, Arca granosa* and *Arca rhombea*. The sand is usually bounded by granite, which appears at the surface at Sadras, Madras and other places. Immediately beyond the town of Pondicherry, however, the recent beds rest upon some low hills of red sandstone. A bed of limestone containing numerous fossils succeeds, and at the distance of four miles due west the red sandstone is again met with and there abounds with silicified wood. At about sixteen miles from the sea the sandstone is bounded by hills of black granite.

The surface of the country does not offer any section exhibiting the relative positions of the limestone and sandstone. In the former, numerous fossils in a high state of preservation were discovered by Mr. Kaye, including species of *Baculites, Ammonites, Nautilus, Hamites, Ptychoceras, Ancyloceras, Voluta, Cypræa, Conus, Tornatella, Rostellaria, Pyrula, Aporrhais, Trochus, Solarium, Natica, Eulima, Scalaria, Cerithium, Turritella, Dentalium,* and *Calyptræa*; *Ostrea, Exogyra, Spondylus, Pecten, Trigonia, Mytilus, Pinna, Arca, Pectunculus, Nucula, Cardium, Isocardia, Anatina, Cytheræa, Solen, Pholadomya, Clavagella, Lutraria* and *Terebratula*. Also some fishes' teeth, *Echinodermata* and corals, accompanied by wood (calcareous) bored by *Teredo*.

The fossil wood found in the sandstone exhibits no traces of worm-borings, and occurs in the form of trees denuded of their barks, some of them as long as 100 feet, and all apparently *Coniferæ*.

2. Six miles from *Verdachellum* in Southern Arcot, about forty miles from the coast and fifty from Pondicherry, the valley of the river is formed of a limestone which underlies the sandstone and contains marine fossils, including species of *Ammonites, Nautilus, Melanopsis* ?, *Pleurotomaria, Natica, Pecten, Arca, Artemis, Modiola, Exogyra, Lima, Cardita, Cardium, Lutraria* and *Terebratula*.

3. *Trinchinopoly*.—In this district, at about thirty miles from the town of the same name, one hundred from Pondicherry, and sixty from the sea, is a limestone formation which Mr. Kaye was unable to visit in person, but from which he procured a quantity of fossils belonging to twenty-seven species of various genera, including *Natica, Turritella, Triton, Fusus, Pyrula, Voluta, Melanopsis* ? (same species as at Verdachellum), *Aporrhais, Strombus, Mactra, Psammobia, Arca, Pecten, Ostrea, Cytheræa* and *Cardium*. A fragment of an Ammonite accompanied them.

None of the species appear to be common to the three deposits. Three species are common to Trinchinopoly and Verdachellum. From the latter locality there are 28 species of mollusca identical with lower greensand fossils found in Britain. A single species appears to be identical with one of those from Pondicherry; but none of the testacea from the last mentioned locality agree with those

from Trichinopoly. The greater part of those from Pondicherry appear to be undescribed forms. Accompanying the very remarkable assemblage of molluscan genera at the latter locality was a single vertebrata of a Saurian, which Professor Owen regards as most nearly resembling that of *Monosaurus*.

Mr. Kaye presented to the Society a series of the fossils from the several beds, all in the most beautiful state of preservation.

MISCELLANEOUS.

On the production of Animalcules in great numbers in the Stomach and Intestines during the digestion of herbivorous and carnivorous Animals. By MM. Gruby and Delafond *.

In 1685 Leuwenhoeck first discovered three species of microscopic animalcules in the excrements of frogs †; Bory de Saint Vincent, Müller, and Ehrenberg have also ascertained the presence of animalcules in the excrements of salamanders ‡. Leuwenhoeck relates that he saw three species of infusoria in the excrements of pigeons, of chickens, and even of man; but a doubt was thrown upon this last discovery by other observers, and particularly by Ehrenberg.

Up to the present time no observer has proved the existence of living animalcules in the stomach and during the digestion of the superior animals. We shall now present to the Academy the observations which we have been making upon this subject for more than a year, reserving the communication of fuller details until we shall have the honour of laying before it the numerous researches which we have made concerning digestion.

1. The ruminating animals have, during the act of digestion, four species of living animalcules in the first and second stomachs.

First species.—Form long and flattened; the body provided with a granulated carapace which is convex above, flattened beneath, and indented towards its posterior part; head distinct; a girdle of vibrating cilia near the middle of the body; a long, conical, and mobile tail; motions of the vibrating cilia rapid; motions of the body slow; length nearly $\frac{1}{4}$th of a millimetre; width $\frac{1}{8}$th of a millimetre. This animalcule has no analogy with those already known.

Second species.—Form ovoid; body covered with a carapace indented anteriorly and posteriorly; a conical tail; a circlet of vibrating cilia at the anterior part of the body; movements very distinct; length $\frac{1}{20}$th of a millimetre, breadth $\frac{1}{30}$th. This species has some analogy with the *Brachionus polycanthus* of Ehrenberg §.

Third species.—Form elongated and cylindrical; a smooth carapace; no tail; vibrating cilia around the mouth; movements very rapid; length $\frac{1}{30}$th of a millimetre, breadth $\frac{1}{30}$th.

* From the Comptes Rendus de l'Académie for Dec. 11, 1843.

† Anat. et Contempl., 1685, p. 38.

‡ Die Infusionsthierchen, p. 331; Leipzig, 1838.

§ Ehrenberg, *loc. cit.* p. 501.